THE TAHANGA BASALT : AN IMPORTANT STONE RESOURCE IN NORTH ISLAND PREHISTORY

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Abstract. An occurrence of fine-grained basalt at Opito, Coromandel Peninsula was exploited extensively from about A.D. 1300 until (?)Early European times. Adzes, roughouts and flakes of this basalt are common in early sites all along the east coast of the Peninsula, and adzes are widely distributed throughout the North Island. The Tahanga source was the focus of a major industrial centre along the eastern Coromandel coast during the Archaic, and probably Classic Maori Periods.

In 1962, two amateur archaeologists reported the existence of an extensive pre-European quarry site near Opito Bay, Coromandel Peninsula (Fig.1). The site (consisting actually of three main sites, N40/8, N40/261, and N40/262) contains abundant evidence of the quarrying of boulder piles (and perhaps *in situ* rock outcrops) scattered around the roughly dome-shaped hill of Tahanga (Fig. 2). Geologically, this is a volcanic plug of dense, fine-grained basalt constituting part of the Tahanga Basalt Formation (an informal name used to describe the largely intrusive members of the Mercury Basalts).

Only recently, however, has the regional importance of this prehistoric stone source been demonstrated. Preliminary results from a study of the basalt were presented previously (Moore 1975), and the widespread distribution of Tahanga Basalt adzes has subsequently been confirmed by Best (1975).

The present paper is based on examination of collections at the Auckland Institute and Museum, published reports on excavated sites, some of the author's own observations on offshore islands, and various pieces of information gleaned from others. Collections at the Taranaki, Gisborne and National Museums were also briefly examined. The aim of this paper is to provide a broad outline of the distribution of the Tahanga Basalt in time and space, its use, and in particular, to stress its importance in the prehistory of the Auckland Region.

Geological Outline

The geology of Kuaotunu Peninsula has recently been mapped by Skinner (in press), and a simplified geological map of the Mahinapua Bay area, which includes Opito Bay, is shown in Fig. 3. The oldest rocks in the area — plug-domes, lava flows and fragmentals of the Mahinapua Andesite Formation — are commonly deeply weathered and do not provide suitable material for adze manufacture. The younger Mercury Basalts however are less weathered, and the volcanic plugs of fine-grained Tahanga Basalt are a particularly good source of fresh, flake-quality stone. The erosion stages, freshness of the basalt, and its rela-

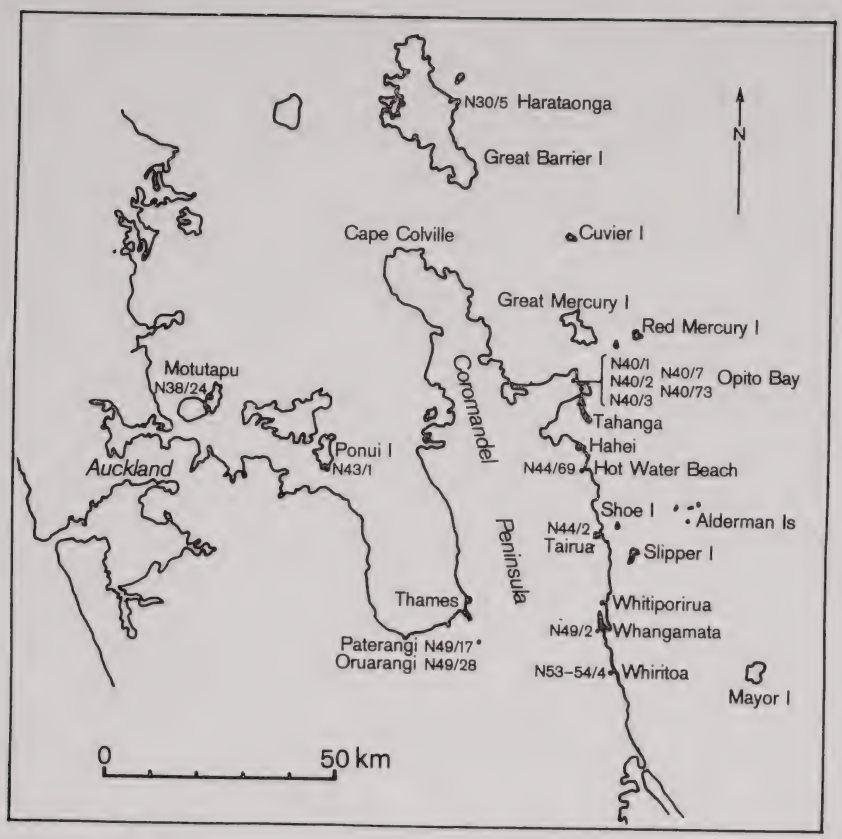

Fig. 1. Map of the Auckland-Coromandel region showing the location of some of the more important sites discussed in the text.

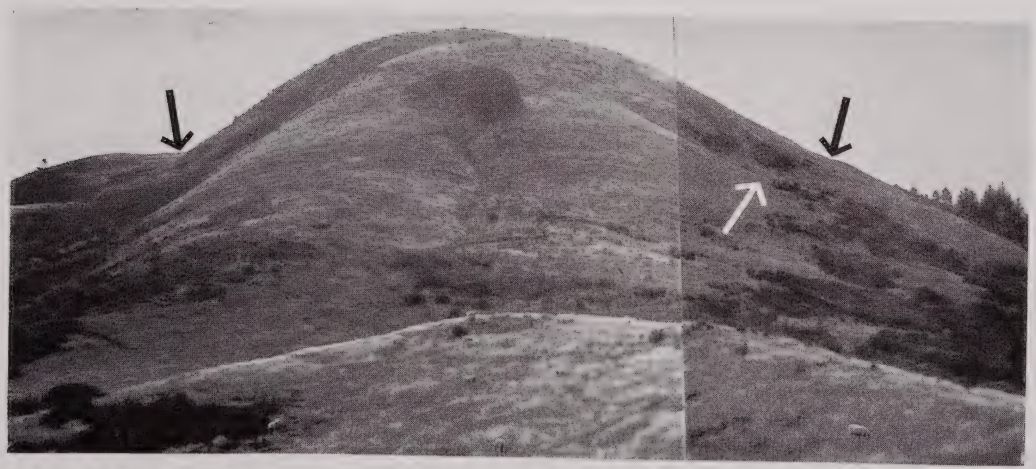

Fig. 2. View of Tahanga (210 m) from the north, showing the position of the three main quarries/working floors. Left, N40/262; upper right, N40/8; lower right, N40/261.

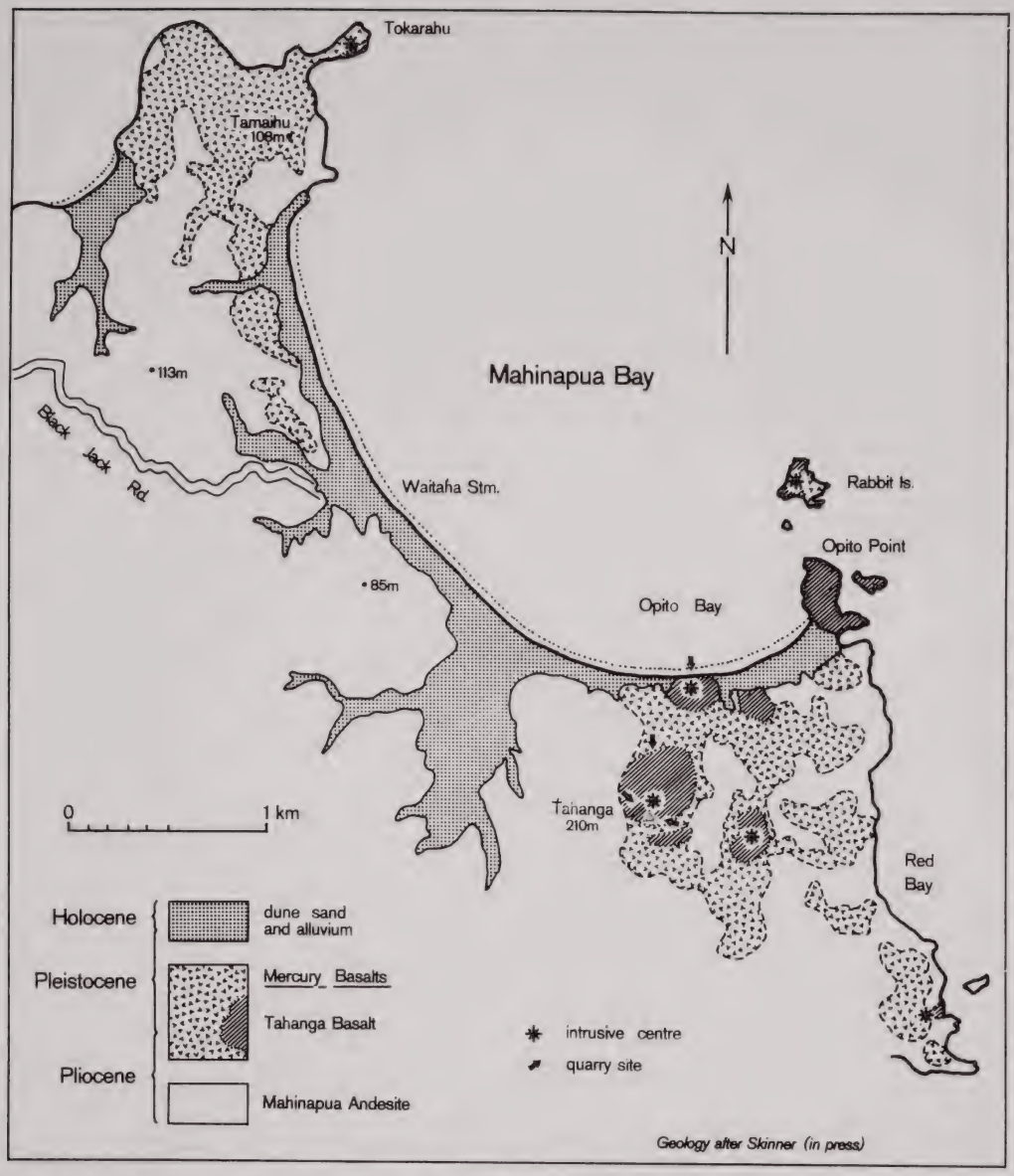

Fig. 3. Simplified geological map of the Mahinapua Bay area, Kuaotunu Peninsula.

tion to terrace levels suggests that the basalt volcanoes, which constitute the last stage of volcanic activity in this area, erupted perhaps 120,000 to 180,000 years B. P. (Skinner, in press).

The Tahanga Basalt is unique amongst the Mercury Basalts of eastern Kuaotunu Peninsula and the Mercury Islands by virtue of its fine grain size, and so far similar rocks are unknown outside Coromandel Peninsula. In addition, outcrops at Opito Bay and Tahanga are the only ones known to have been quarried (or probably quarried), so that flakes, adzes and roughouts of fine-grained basalt can

be assigned to the Tahanga-Opito sources with a considerable degree of confidence.

It is important to note that Tahanga was previously thought to consist of "greywacke" (following Fraser & Adams 1907) and depicted as such on the 1:250,000 geological map of Coromandel Peninsula (Schofield 1967). The error is understandable as the basalt is so fine grained that, in spite of its obvious crystallinity, it could mistakenly be identified as greywacke in hand specimens. However, this error obviously caused some confusion among early excavators in the area (Crosby 1963, p. 17) and undoubtedly resulted in a number of misidentifications of the lithology. This is probably the major contributing factor to delay in recognition of the regional importance of the prehistoric Tahanga Quarry.

TAHANGA QUARRY : DISCOVERY AND RESEARCH

The existence of a pre-European quarry site on Tahanga was first brought to the attention of archaeologists by Messrs. H. Pos and R. W. G. Jolly late in 1962, after a preliminary investigation by Jolly and P. Murdock on July 14, 1962 (Shaw 1963). Trower (1962), during excavations in January that year had already identified one source of basalt cropping out on the shore of Opito Bay. Previously, when excavation began at Sarah's Gully N40/9 in 1956-7 (Golson 1959), the source of recovered stone artifacts was not realised, even though evidence of stone tool manufacture was revealed during excavation.

Between 1957 and 1962 considerable quantities of basalt adzes, roughouts and flakes were recovered from excavations at Opito Beach (Golson 1959; Jolly & Green 1962; Trower 1962), Skippers Ridge (Parker 1959) and Tairua (Smart & Green 1962). Unfortunately material from the latter site was misidentified as greywacke, so that it was not until Crosby (1963) positively identified the source of stone flakes at Whiritoa by petrological examination that the Tahanga quarry was shown to be of more than just local importance.

The importance of the basalt quarry at Tahanga was further stressed when Green (1963, p. 64) stated that this was the source "from which most of the material for archaic adzes on the Coromandel coast comes". The extent of adze manufacture also became apparent from Shaw's (1963) description of the quarries/working floors on and around the hill, where considerable numbers of flakes, flaked cores, roughouts, and hammerstones were recorded. Later site recording by Buist (1965) added two further working floors to this industrial site, and also showed that basalt artifacts were common to all middens in the Kuaotunu area.

More recently Best (1975) has carried out extensive sampling and thin-section examination of the basalt on Tahanga and on the promontory to the north and found little variation in texture. None of the other occurrences of Tahanga Basalt in the vicinity have yet been examined in detail, but they are unlikely to have been quarried to any extent; at least no sites have been recorded on them.

DISTRIBUTION

The widespread distribution of Tahanga Basalt artifacts in the North Island, based largely on the Auckland Museum collections, has already been shown by Moore (1975). Working on collections from Mt Camel, some Manukau Harbour

sites, and Kaupokonui, Best (1975) has since confirmed this distribution pattern by microscopic examination, and his work demonstrates that, except in a few cases, Tahanga Basalt artifacts can be confidently identified by macroscopic methods alone. With the groundwork now completed the distribution pattern of this lithology should be open to considerable modification and expansion.

AUCKLAND

Motutapu Island

Of the five sites excavated on Motutapu to date two, N38/21 and N38/24, are coastal working floors, and at least two other such sites are known (Davidson 1970, p.8). There is therefore considerable evidence for extensive use of local greywacke for adze manufacture, and Motutapu I is likely to have been a major source of stone in the Auckland area.

The discovery of a single roughout adze of Tahanga Basalt (No. 43562) associated with the Sunde site N38/24 (Scott 1970) may have some significance. Although the roughout is a surface find fallen out of the section and hence not able to be related to the stratigraphy of the site, the possibility that it is derived from the cultural layer beneath the Rangitoto Ash cannot be dismissed. (Fig. 4, see below p.86). This level is assigned to the Settlement Phase by Davidson (1972, p.11), but even if the roughout is derived from higher levels (levels 3 and 4) it indicates possible spread of Tahanga Basalt artifacts into the Auckland area during the Archaic Phase of occupation.

Ponui Island

Site N43/1 on Ponui I (Nicholls 1964) is so far the only excavated site in the Auckland area in which *flakes* of Tahanga Basalt have been recognised. The common small flakes and few roughouts from the section indicate that Tahanga Basalt was actually *worked* on the island, even though a good source of greywacke was present only 25 km away on Motutapu I. Unfortunately the stratigraphic position of the flakes is unknown, but the earliest level (level III) at this site has been assigned to the Developmental Phase by Green (1964, p. 138, fig. 2).

The common use of Tahanga Basalt on Ponui I is also supported by the record of basalt "flaked points" (or drill points) from this site (Nicholls 1964, p. 30), and a small collection of basalt adzes from the island as a whole (Auckland Museum collections).

A wide range of flake lithologies including greywacke, basalt and (?)andesite have been collected from site N43/1, in marked contrast to similar sites on nearby Motutapu I. The utilisation of different rock types at this site warrants further study.

Manukau Harbour

Adzes, roughouts and flakes of Tahanga Basalt have been identified by Best (1975 p. 31) in collections from two sites at Wattle Bay — the University site N46-47/16, and the Bramley site N46-47/17. In addition, in a collection of eighteen adzes from near Ihumatao, five were of "early appearance" and all were macroscopically similar to Tahanga Basalt (Best 1975, p. 29). Two of these, and one of the remaining thirteen adzes were thin-sectioned and their Tahanga origin confirmed.

GREAT BARRIER ISLAND

Three sites have so far been excavated on Gt. Barrier, all at Harataonga Bay on the east side of the island (Law 1972). Of these only N30/5 has a rich artifact assemblage and is apparently the oldest, probably Archaic (Law 1972, p. 121).

Numerous flakes of Tahanga Basalt have been collected from this site, and as noted by Law (p. 91) is the most common lithology amongst the flake material. This is significant in view of the fact that a local quarry site has been recorded at Tryphena (Spring-Rice 1962, p. 94); the dominance of Tahanga Basalt may therefore reflect the early age of the site, in good agreement with the dominance of Mayor I obsidian (Fig. 5, see below p. 88).

Basalt is also the dominant lithology of adzes (Law 1972, p.91) and roughouts from the site, and surface collections from Harataonga Bay include a number of adzes and roughouts of Tahanga Basalt (Auckland Museum collections).

COROMANDEL PENINSULA

Of the 14 sites along the east coast of Coromandel Peninsula excavated up until May 1969 (Law 1969) eight provide information on the utilisation of Tahanga Basalt. Five of these are located at Opito Bay within 3 km of Tahanga and hence provide a valuable record of the use of this stone source.

Mahinapua Bay

Of the five main sites considered here, two (N40/1 and N40/3) are middens, N40/2 a flaking floor, and N40/7-73 a pit-terrace complex. Sites N40/1 and N40/2 show a complete dominance of basalt flakes over any other lithology (Fig. 5), whereas N40/3 shows a dominance of siliceous flakes. Although there would appear to be some difference in age between these 3 sites (Green 1964, fig. 2), the different flake assemblage of N40/3 is considered to be related more to function of the site than to age.

Site N40/2 (Jolly & Green 1962) is the only excavated working floor apart from Tahanga Quarry (N40/8) itself. The number of large flakes recovered suggests that roughouts were fashioned here and transported elsewhere for finishing, perhaps to sites like N40/1 where the flakes are generally smaller (Jolly & Green, p. 42). The extent of adze manufacture at N40/2 alone can be gauged from the material recovered from layer 4 in particular — 461 struck flakes, 11 roughouts, 42 broken pieces of roughouts, 4 large core blocks, and two partly ground adzes (Jolly & Green 1962; Jolly & Murdoch 1973).

Basalt flakes recovered from N40/1 range from 4 x 3 cm up to 10 cm diam. in the upper midden (Jolly & Green 1962), though mostly 2-6 cm, and from 4-12 cm in the lower midden. Those from N40/2 range from 3-11 cm, and from one stone pile on Tahanga itself, flakes approx. 13 x 13 cm in size were recovered from a test pit (Shaw 1963, p. 35). There is little doubt therefore of extensive working of large blocks of basalt, which as stated by Jolly & Green (1962, p. 42) "lends credulity to the roughouts for adzes of a foot to a foot and a half in length which have been found elsewhere at this beach".

The stone flake material recovered from excavations at site N40/7 (Parker 1959, 1960) has recently been analysed in detail by Davidson (1975). Basalt flakes and pieces are common in all three occupation layers and there is some suggestion, though somewhat speculative, that utilisation of basalt and other stone materials may have increased with time. The greater proportion of basalt pieces ("flakes" without striking platforms) in the upper levels might indicate increased working of stone, but could equally reflect a change in the type of tool being manufactured or method of production.

Hahei

Site recording in the Hahei area (Moore, n. d.) has revealed several working floors containing abundant basalt flakes, and the possibility of others lying beneath the sand dunes; some sites have already been destroyed. Tahanga Basalt flakes are also common at site N44/90, a midden, and on the headland pa Hereheretaura, site N44/7.

Tahanga Basalt is also the dominant lithology of artifacts in the Harsant Collection (Hahei). Of some 35 adzes and roughouts approximately 25 (or 70%) are of basalt, and these include a wide range of Archaic and Classic types.

Hot Water Beach

Site N44/69, recently excavated by Leahy (1974), is one of the few well-controlled, adequately dated excavations along the Coromandel coast. Even more importantly, its stone flake assemblage has been thoroughly analysed and provides valuable information on the use of various stone materials. In particular, of the 864 pieces of basalt recovered only 97 showed signs of use (Leahy 1974, p. 57), and together with the generally small size of flakes this suggests that pre-shaped blocks of basalt were brought to the site and worked into complete adzes.

Basalt pieces and used flakes occur in all layers; the use of basalt therefore continued over an estimated period of about 250 years at this site, between A.D. 1300 and A.D. 1540 or later (Leahy 1974, p. 73).

Tairua

Site N44/2 (Smart & Green 1962) provides, so far, some of the best evidence for widespread use of Tahanga Basalt in the 13th century, and possibly as far back at A.D. 1100. Basalt tool flakes, recorded as greywacke by Smart & Green (1962, Table 1), are common in Layer 2 which was initially dated at 879±49 yrs B.P. but has subsequently yielded dates of 443 and 570 yrs B.P.

The very high proportion of Mayor I obsidian flakes from this layer and the relatively early date suggested by hydration rim readings (Green 1964, figs. 1, 2) support the 13th century date (or older) for the earliest occupation of this site.

One important aspect arising from the extensive excavation of this site is the clear evidence for differentiation of activities (Jones 1973). The result of differentiation in this particular case is that stone flakes vary in abundance and relative proportion over the site, so that percentages of the various stone materials utilised as represented in Fig. 5 should be treated as approximate only. It follows there-

fore that estimates of age of a site based on relative proportions of flake lithologies must be treated with considerable caution unless supporting evidence, from radiocarbon dates, cultural material, and non-cultural time markers (e.g. Loisels Pumice), is available.

Whiritoa

A single extensive midden at Whiritoa Beach, N53-54/4, has been excavated over a number of years and described by Crosby (1963) and Foreman & Jolly (1965). Tahanga Basalt flakes and adzes occur in the oldest cultural layers which, although not dated precisely, appear to be post Loisels Pumice and possibly belong to the Experimental Phase (Crosby 1963, p. 48).

From the large numbers of roughouts and waste flakes (2,422) of basalt recovered from the site (Crosby n.d.), it is evident that Whiritoa was a working floor. It would appear that large shaped cores were transported from Tahanga Quarry and finished into a wide variety of adzes (Table 1, see below p.90), though it is unknown if all these types were produced during a single occupation or not. The large number of "unused" basalt flakes (96%) might also suggest that this material was readily obtained from its source.

Whitiporirua

Although small excavations of the extensive midden deposits at the south end of the beach (N49/16) have been carried out, the stratigraphy is poorly known. Abundant basalt flakes have been collected, presumably from this site, indicating the presence of working floors.

Whangamata

In contrast to other Archaic middens on the Coromandel coast, the Whangamata Wharf site N49/2 (midden B) contains remarkably few basalt flakes (Allo 1972). Again this is probably related to function of the site, since considerable numbers of dog bones and obsidian flakes were recovered. Only 2 broken adzes of Tahanga Basalt were recorded, one from each midden (Fig. 4).

From a nearby midden however, Shawcross (1964) has recorded a rich assemblage of basalt flakes, including drill points, associated with Classic Maori artifacts (Allo 1972, p. 61). Analysis of these flakes suggests that they are largely the waste products of adze manufacture, but some do show signs of use (Shawcross 1964, p. 18).

Offshore Islands

Surface collections of artifacts have recently been made on Cuvier I (J. Davidson, pers. comm.) but little can be stated at present other than the fact that flakes and roughouts of Tahanga Basalt are found there.

Great Mercury I has been the subject of a recent study by Edson (1973). Tahanga Basalt is represented by abundant flakes, roughouts, and adzes, but little is known of its stratigraphic relationships. Abundant basalt flakes and some roughouts have also been reported from nearby Red Mercury I (Moore 1972 a, b), but again the stratigraphy is unknown.

Further south, sites on the Aldermen Is have, significantly, yielded only a single basalt adze, and no basalt flakes (Moore 1973). The adze, either a 3B or 2C type (Duff 1956), is probably Archaic, correlating well with the almost complete dominance of Mayor I obsidian. However, there is no other evidence for Archaic occupation, and the abundance of Mayor I obsidian may merely reflect the close proximity (37 km) to this source.

Further inshore, some sites on the Slipper Island Group also contain abundant Mayor I obsidian associated with basalt flakes (Atwell *et al.* 1975). Adzes and roughouts of basalt have been collected from Slipper I (Auckland Museum collections), and from nearby Shoe I by the author.

Miscellaneous

Although adzes of Tahanga Basalt have been recorded from a number of localities on Coromandel Peninsula (Moore 1975), in only a few areas do they appear to occur in any number. Thus areas from which ten or more adzes have been collected, such as Amodeo Bay (near Colville), Waihi Beach, and Katikati and Tauranga further south, are likely to provide important information on the use of this basalt source.

Isolated occurrences of Archaic adzes, such as the side-hafted adze collected from Cape Colville (recorded by Duff 1956, p. 196) may also provide an idea of the extent to which this source was utilised during the earliest cultures.

HAURAKI PLAINS

Adzes of Tahanga Basalt have been recorded from a number of localities in the Hauraki Plains, but there seems to be a particular concentration of finds in the Thames area (Moore 1975). At two sites in particular — the swamp pa of Oruarangi N49/28 and Paterangi N49/17 (Shawcross & Terrell 1966) — adzes of this lithology are relatively common, especially at the former site. Of the adzes from "Oruarangi" (including Paterangi?) in Auckland Museum collections approx. 20% are made from Tahanga Basalt, the remainder being mainly greywacke, with a few of andesite and other lithologies. The adzes described by Fisher (1936) from Oruarangi were all considered (p. 18) to be greywacke, but in fact two (Nos 19598.65 and 66) are of Tahanga Basalt. It is interesting to note that these adzes are among the largest recorded (Shawcross & Terrell 1966, fig. 9) and that both belong to Fisher's (1936) type B (later shown to be a variant within a single 2B style by Shawcross & Terrell).

The stratigraphy of these two sites is poorly known and there are no C14 dates available. Doubt has been expressed about the "Classic Maori" style of artifacts from Oruarangi and Paterangi (Shawcross & Terrell 1966, p. 407), and although all the adzes from Paterangi are Duff type 2B, those collected from Oruarangi (Auckland Museum collection) include a number of possible Archaic types in Tahanga Basalt (Best 1975). The high ratio of Mayor I : non-Mayor I obsidian (R. C. Green pers. comm.) in this site also suggests that Oruarangi may have been occupied in earlier times. On the other hand, a ?Classic Maori-European dating of these sites (Shawcross & Terrell 1966, p. 428) could indicate that Tahanga Basalt adzes were still widely distributed in Classic Maori and later times.

OTHER AREAS

Outside Coromandel Peninsula (and northern Bay of Plenty), large numbers of basalt adzes have been collected from only a few areas, namely Rotorua, Auckland City, Muriwai Beach, Maungaturoto, Kaipara Harbour and Mt Camel (Best 1975). Whether this distribution represents a definite trading pattern or simply reflects the more intense occupation of these areas cannot be determined at present, but the widespread occurrence of Type 2B and occasional "hogback" (e.g. Whangaparaoa) basalt adzes suggests at least the Tahanga source was utilised extensively over a long period of time.

Stratigraphy of Sites

The stratigraphy of some important, well-documented sites in the Auckland - Coromandel Peninsula area, and the types of basalt artifacts recovered from

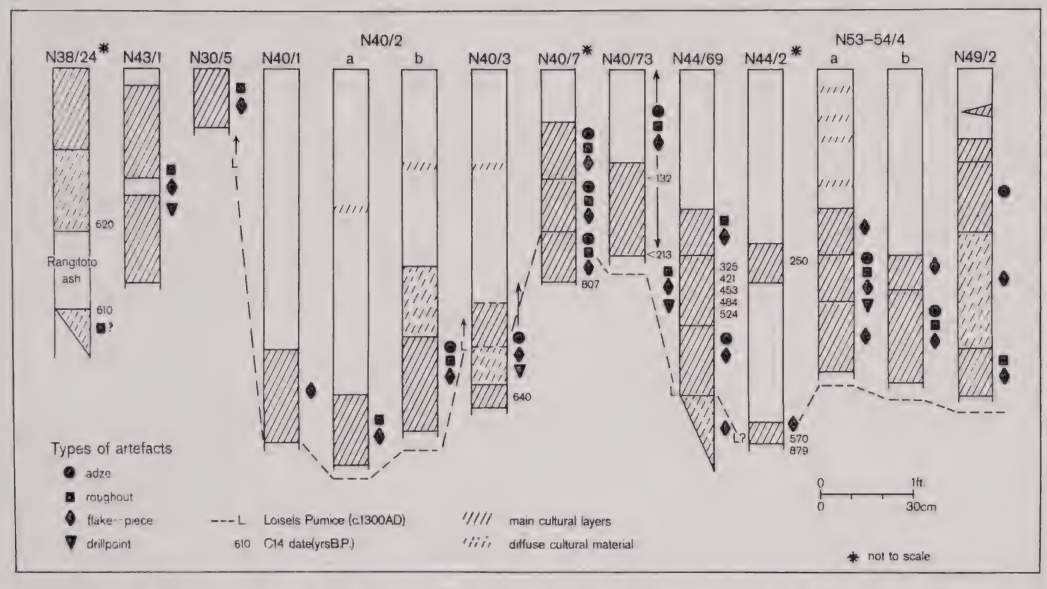

Fig. 4. Stratigraphy of some important sites, and types of basalt artifacts. (Note: for flake-piece read flake + piece)

Key to Figure 4

Site No.	Location	Source of Information
N38/24	Motutapu Is. (Sunde site)	Scott (1970)
N43/1	Ponui Is.	Nicholls (1964)
N30/5	Harataonga, Gt Barrier Is.	Law (1972)
N40/1	Opito	Trower (1962)
N40/2 (a)	Opito	Murdock & Jolly (1967)
N40/2 (b)	Opito	Jolly & Murdock (1973)
N40/3	Opito	Green (1963)
N40/7	Skippers Ridge, Opito	Parker (1959, 1960)
N40/73	Skippers Ridge, Opito	Bellwood (1969)
N44/69	Hot Water Beach	Leahy (1974)
N44/2	Tairua	Smart & Green (1962)
N53-54/4 (a)	Whiritoa	Crosby (1963)
N53-54/4 (b)	Whiritoa	Foreman & Jolly (1965)
N49/2	Whangamata	Allo (1972)

cultural layers within those sites is shown in Fig. 4. The diagram clearly illustrates three main points:

(1) The widespread distribution of Tahanga Basalt in the Auckland - Coromandel region.

(2) The occurrence of basalt artifacts in the *lowest* cultural layers of all of the sites (except perhaps N38/24).

(3) The wide range of artifact types present.

The important stratigraphic records are those of sites N40/3, N40/7 and N44/69, as these provide the most reliable evidence for utilisation of Tahanga Basalt about A.D. 1300. That the basalt was also widely distributed at an early time is shown by the occurrence of artifacts in the oldest layers of two sites well removed from the Tahanga quarry, namely N30/5 (Gt Barrier) and N53-54/4 (Whiritoa).

From the common occurrence of basalt flakes, and in many cases also adzes and roughouts, in the earliest occupation layers it is clear that adze manufacture was one of the main occupations of the early Maori settlers along the east coast of Coromandel Peninsula. The whole of this coast then can be regarded as a major industrial centre, adze roughouts, or perhaps large basalt blocks, being exchanged or obtained directly from the Tahanga quarry and manufactured into finished adzes. Whether or not the manufacturing was carried out by separate groups permanently or seasonally inhabiting the same site, or by a single group migrating up and down the coast is one question yet to be answered.

Relative Chronology of Sites

The distribution of Tahanga Basalt through space, and to some extent time, is illustrated in Fig. 4. Distribution through time is more difficult to assess, and Fig. 5 is an attempt at a relative chronology of some important sites, based on four independent factors:

(1) proportion of Mayor I to non-Mayor I obsidian (Green 1964)

(2) obsidian hydration rim dating (Green 1964)

(3) radiocarbon dates (see Fig. 4)

(4) position of Loisels Pumice (if present) in the stratigraphy of a site (also see Fig. 4).

The figure also shows the relative proportions of *all* stone flakes recovered from the main cultural layer (or layers) of each site. In the case of Oruarangi and Paterangi proportions are based partly on adze lithologies.

The ratio of basalt flakes to flakes of other lithologies (excluding obsidian) may depend largely on the function of the site, and whether or not there is marked differentiation of activities (e.g. Jones 1973). The very different proportions of basalt to "other" flakes in sites N40/3 and N40/7 almost certainly reflects their function, the former being a midden, and N40/7 a pit complex. Thus, it seems unlikely that the proportions of stone flakes alone could ever be used as a *reliable* indicator of age.

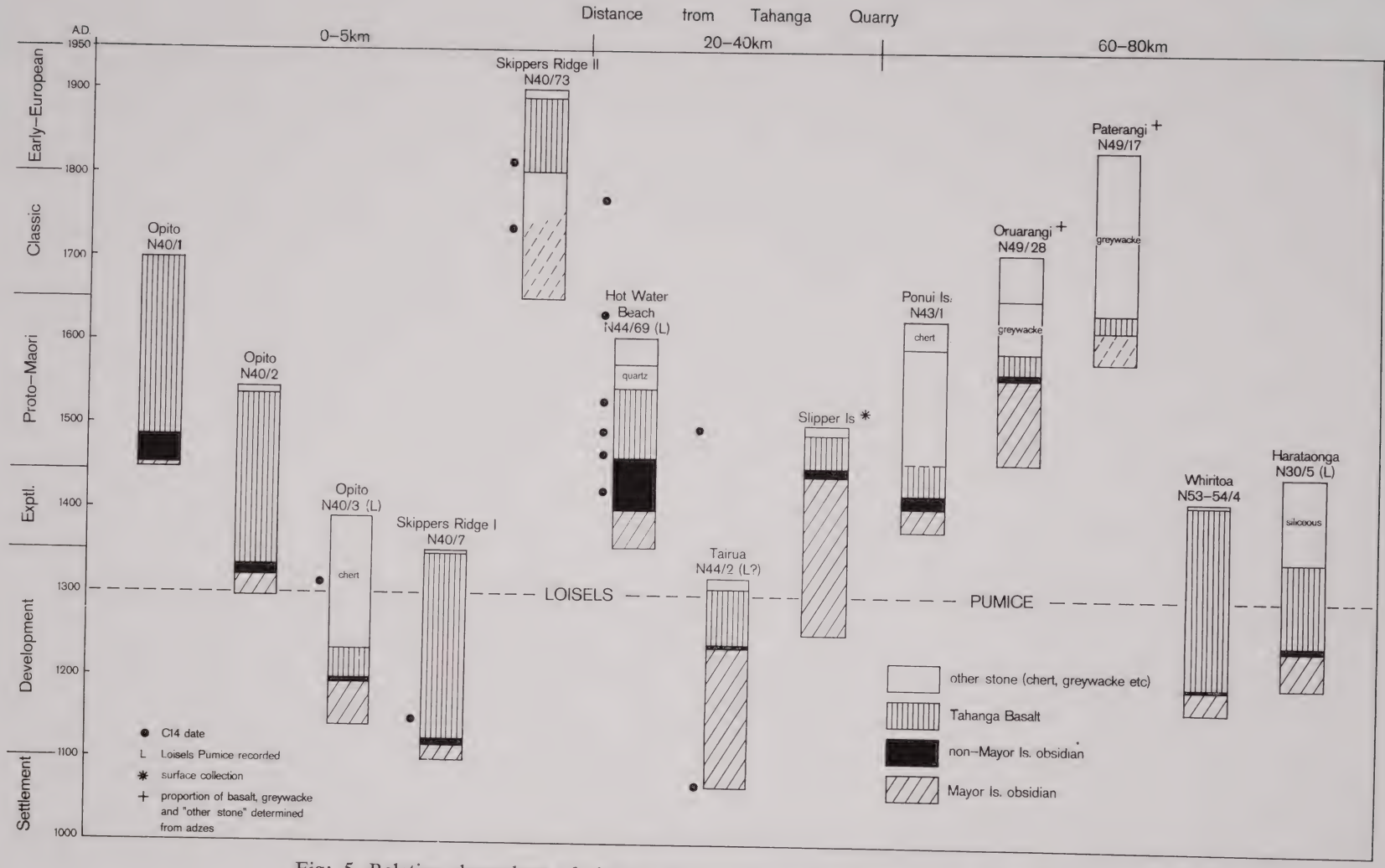

Fig: 5. Relative chronology of sites, and proportions of recovered stone materials.

Since some other evidence for age of sites is available, two rather tentative statements could be made from the data presented in Fig. 5.

(1) That close to its source the basalt seems to have remained an important material until Early European times (site N40/73).

(2) In more distant areas (e.g. Paterangi) use of the basalt may have declined with time, either because of restricted trade or access to the source, or because of a change in technology.

Types of Artifacts and Their Use

The main types of adzes manufactured seem to be the typical Archaic forms — 3B, 4A and 5 — and the main Classic type, 2B (Table 1). Other minor types in basalt are 2A, 3B or 2C, and 3 and less certainly in basalt, types 1, 1A and 6. The widespread occurrence of both Archaic and Classic types also indicates utilisation of Tahanga Basalt over a considerable period of time.

Four side-hafted (Type 5) adzes, probably all in Tahanga Basalt, have now been recorded from Coromandel Peninsula (Table 1). Duff (1956 p. 196) listed only five from the whole of the North Island and, of these, one from Cape Colville is in Tahanga Basalt, a second from Kawhia is in basalt, but of uncertain origin, and a third from Katikati is of unknown rock type. Thus the first use of the Tahanga source can almost certainly be credited to an early (Moa-hunter) culture.

The occurrence of basalt drill points, "knives", flake tools and used flakes points to the use of this material for a wide variety of activities. Few definite uses however have been suggested. Duff (1956 p. 184) has proposed that the side-hafted adze was used for "trimming the inner wall of narrow excavations in wood, such as canoe hulls, food bowls, etc.". A variety of purposely modified flakes and used struck flakes recovered from excavations at Whiritoa (N53-54/4) appear to have been used as hand-held groove tools and simple cutting and scraping tools respectively (Crosby, n.d.). This latter use for flakes is in good agreement with

Key to Figure 5

Where sources of information are the same as those given in the Key to Figure 4 they are not repeated.

Site No.	Site Type	Source of Information
N40/1	midden	Jolly & Green (1962); Green (1963, 1964)
N40/2	flaking floor	Jolly & Green (1962); Green (1963, 1964)
N40/3	midden	Trower (1962); Green (1964)
N40/7	pit complex	Green (1964); J. Davidson (pers. comm.)
N40/73	variable activity site	—
N44/69	stratified midden	—
N44/2	variable activity site	—
Slipper Is.	midden	Atwell et al. (1975)
N43/1	midden	—
N49/28	swamp pa	R. C. Green (pers. comm.)
N49/17	swamp pa	Shawcross & Terrell (1966)
N53-54/4	midden	Green (1964); Crosby (n.d.)
N30/5	midden	—

Table 1. Types of basalt artifacts and their abundance.

Site number and reference	Adze types and abundance	Roughout	Flake	Core	Drillpoint
N30/5 (Law 1972)	4A, 1A?	X	C		
N38/24 (Scott 1970)		X			
N40/1 (Green 1963)	(X)		A		
N40/2 (Green 1963; Jolly & Murdock 1973)	3B, 4A, 5	C	A		
N40/3 (Green 1963; Trower 1962)	Archaic (X)		X	X	X
N40/4 (Green 1963)	Archaic (X)				
N40/7 (Parker 1959; Green 1963; Davidson, pers. comm.)	2B?, 3, 4A	C	A	X	
N40/8 (Shaw 1963)		A	A	C	
N40/9 (Green 1963)	4A				
N40/10 (Green 1963)	(X)		X		
N40/73 (Bellwood 1969)	2B, 2A	X	C	X	
N40/75 (Moore 1972a)	2B	X	A		
N43/1 (Nicholls 1964)		X	C		X
N44/2 (Smart & Green 1962)			C		
N44/69 (Leahy 1974)	3B, 4B, 5	X	A	X	X
N44/90 (Moore, n.d.)			A		
N45/5 (Moore 1973)	3B or 2C				
N49/2 (Allo 1972)	(R)		R		
N49/– (Shawcross 1964)		X	A		X
N49/17 (Shawcross & Terrell 1966)	2B (C)				
N53–54/4 (Green 1959; Crosby 1963, n.d.; Foreman & Jolly 1965)	3B, 4A, 5 1, 6?, 2B?	C	A		X
Cape Colville (Duff 1956)	5				

(A = abundant; C = common; R = rare; X = present, abundance unknown)

that suggested by Bellwood (1969, p. 210), namely in polishing or finishing of woodwork, and possibly for flax preparation. The poorer cutting ability of basalt edges (as compared with obsidian) but greater resistance to chipping and abrasion would tend to suggest this was a major use for flakes.

Possible knives have been recorded by some authors (Parker 1959; Leahy 1974) but their purpose is unknown.

Discussion and Conclusions

The importance of Tahanga Basalt in the prehistory of the northern half of the North Island in particular has now been amply demonstrated. Recent work by Best (1975) has confirmed the widespread distribution of this rock type, its distinctive and uniform character, and restricted occurrence. Published excavation reports provide evidence of its early and long-continued use, particularly in the Coromandel region, and evidence that the eastern Coromandel coast was a major adze manufacturing centre. The main conclusions that can now be made are:

(1) The Tahanga source was probably discovered about A.D. 1200, or perhaps even earlier; certainly the basalt was widely distributed by A.D. 1300.

(2) Use of the basalt continued over a long period of time, and near its source, probably until Early European times.

(3) Along the eastern Coromandel coast at least, large pre-formed blocks of basalt were probably traded and/or obtained directly from the source.

(4) The stone was used in the manufacture of a wide variety of adzes, but particularly Archaic types. Waste flakes were probably used in woodwork, or for the preparation of flax.

Still some important questions have yet to be answered. For instance, what is the relationship of the Tahanga Quarry to nearby quarries at Motutapu I and Tryphena, and the gabbro source in Northland (Best 1975)? What are the details of its distribution and chronology in the southern North Island? Why do large numbers of Archaic Tahanga Basalt adzes occur at Mt Camel, as has been shown by Best (1975), and do similar records of early trade or direct exploitation exist in other areas far removed from the source? And finally, what was the nature of the adze-manufacturing population along the eastern Coromandel coast?

Some of these answers might be found in existing records, but obviously there is ample scope for further original investigation.

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